BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI (RAJ.)

CS F111 Computer Programming

LABORATORY SESSION #8

(*Flow Control*)

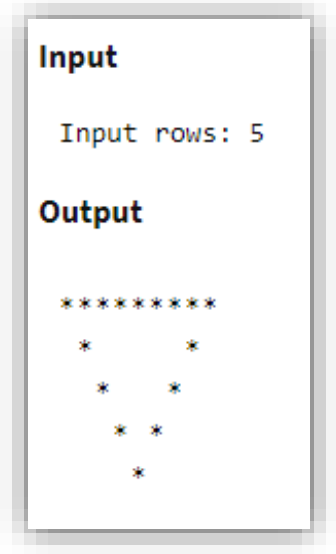
1. Write a C program which accepts a user input 'n', and computes and prints the factorial of n. Test your code with small values of n as well as large values of n (say in millions). What is your observation? Does the code work fine with the factorial variable as an integer? What is the appropriate data type to be used for the factorial variable?

2. Write a menu-driven program which allows the user to repeatedly enter a choice and a number.
   a. If the choice is **b**, the number entered is binary (unsigned). Convert it to decimal and print the answer.
   b. If the choice entered is **d**, the number entered is decimal. Convert it to binary and print the answer.
   c. If the choice entered is **x**, the program terminates.
   d. If any other choice is entered, ask the user to enter a valid choice.

3. You are familiar with the Fibonacci series. The Padovan sequence is similar to Fibonacci sequence with a similar recursive structure. The recursive formula is,
   $P(n) = P(n-2) + P(n-3)$
   $P(0) = P(1) = P(2) = 1$
   And the sequence: 1, 1, 1, 2, 2, 3, 4, 5, 7, 9, 12, 16, 21, 28, 37,.....
   First write a C program to generate Fibonacci sequence up to user input n. Then modify that code to generate Padovan sequence up to n.

4. An Armstrong number is an n-digit number such that the sum of its digits raised to the power n is the number itself. For example, the number 153 has three digits, and $1^3+5^3+3^3 = 153$. Therefore 153 is an Armstrong number. Write a C program which accepts two numbers and finds all Armstrong numbers in that range.

5. Using loops, write a C program to create a hollow star pattern as shown here:



6. Until interrupted, the following code prints TRUE FOREVER on the screen repeatedly:

```
while (1)
     printf("  TRUE FOREVER  ");
```

   Write a simple program that accomplishes the same thing, but use a for statement instead of a while statement. The body of the for statement should contain just the empty statement ";".